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Planning for sustainability in small municipalities: The influence of interest groups, growth patterns, and institutional characteristics

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Abstract

How and why small municipalities promote sustainability through planning efforts is poorly understood. We analyzed ordinances in 451 Maine municipalities and tested theories of policy adoption using regression analysis. We found that smaller communities do adopt programs that contribute to sustainability relevant to their scale and context. In line with the political market theory, we found that municipalities with strong environmental interests, higher growth, and more formal governments were more likely to adopt these policies. Consideration of context and capacity in planning for sustainability will help planners better identify and benefit from collaboration, training, and outreach opportunities.

Keywords

Municipality, sustainability, policy adoption, environment, town meeting, political market, interest group, public choice

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Introduction

Embedding sustainability into practice involves actions at all scales of government, from international treaties to local regulations (Gibbs, Jonas, and While 2002; Ostrom 1999). Both planners and researchers have increasingly explored the role that municipalities play in advancing sustainability by adopting policies and programs that promote social, economic and environmental well-being (Clark 2007; Jepson 2004; Kates, Parris, and Leiserowitz 2005; Portney and Berry 2010; Slocombe 1993; WCED 1987). At the local level, municipal planners are often in the position of navigating these multiple goals: creating growth in their communities, ensuring all residents have access to opportunities, and maintaining the ecological integrity of natural resources while doing so (Campbell 1996; Downs 2005; Hanna 2005).

Research on municipal sustainability efforts in North America has shown that larger municipalities are significantly more likely to adopt policies that support sustainability than

smaller communities (Conroy and Iqbal 2009; Homsy and Warner 2014; Lubell, Feiock, and Handy 2009). We follow others who define small municipalities as those with populations of less than 50,000 residents. Small, often rural municipalities, are frequently cited as lacking the technical resources or knowledge to engage in innovative planning (Berke and Conroy 2000; Bulkeley and Betsill 2005; Miller et al. 2009; Wilson 2006). Similarly, small municipalities may adopt fewer sustainability policies because they face political unwillingness and fiscal constraints (Knox and Mayer 2012). However, most of the studies that include smaller municipalities have evaluated their contribution to sustainability using the same set of policies used by larger cities, many of which, such as public transportation, eco-industrial park development, or brownfield redevelopment are irrelevant for smaller communities (Lubell, Feiock, and Handy 2009; Saha 2009). Relatively little of the published research has focused specifically on smaller cities and towns (Holman 2014; Knox and Mayer 2012; Lubell, Feiock, and Handy 2009).

Despite the challenges that smaller municipalities may face in adopting sustainability policies, some have successfully done so (Knox and Mayer 2012). While a sustainability policy in a large city may have a larger effect than the same initiative in a smaller city, smaller municipalities can also make meaningful contributions (Portney 2013), such as by protecting large tracts of undeveloped land and providing affordable housing. Additionally, smaller municipalities would likely focus on fewer sustainability initiatives that fit their scale and issues, such as encouraging mixed-use downtowns while maintaining rural character (Edwards and Haines 2007). Given this, it is not surprising that small municipalities pale in performance compared to larger cities when using the same index of polices. There is an opportunity to specifically examine the role of the small municipality using metrics relevant to that context.

Doing so can enable planners to identify areas with promise for future sustainability programs, to target education and outreach efforts, and to consider collaborative planning prospects.

Just as important as distinguishing if and how smaller municipalities contribute to sustainability is identifying what enables some to do so more than others. Much of the planning literature assesses the role of planners (Conroy 2006; Hanna 2005; Jepson 2004) or the role of specific socio-economic or institutional characteristics (Conroy and Iqbal 2009; Howell-Moroney 2004; Jepson 2004; Portney and Berry 2010) in advancing sustainability policies in cities of various sizes. Factors such as higher income and education, high levels of community growth, greater community participation, the presence of planners, and adequate knowledge have been associated with greater policy adoption. We are interested in complementing this influential research by drawing on a recent political market theory of local policy adoption that specifically combines institutional factors along with public choice and interest group theories, thereby incorporating many of the variables typically considered by planning scholars (Feiock, Tavares, and Lubell 2008; Lubell, Feiock, and de la Cruz 2009; Ramirez de la Cruz 2009). Our goal is to better understand the suite of factors that enable or constrain planning processes that lead to the adoption of municipal sustainability policies and programs.

We pose two over-arching questions: (1) Do smaller municipalities adopt policies and programs that promote sustainability?, and (2) If so, why do some municipalities do so more than others? We address these questions by analyzing land-use and subdivision ordinances for the presence of eight policies and programs that promote environmental, economic and social well-being and by estimating regression models to test prevailing theories that explain the drivers of policy adoption. Our paper's main contribution is to bring attention to the potential role of smaller communities in sustainability planning and to illustrate the importance of assessing

planning efforts in these municipalities in ways relevant to their size and context. Doing so may help to structure understanding of the constraints and opportunities that face planners, and to shape planning education and collaboration.

Conceptual framework: Municipal sustainability planning and policy adoption

Sustainability, with its focus on economic development, environmental protection, and social equity, has emerged as a viable framework for guiding municipal planning (Berke 2002; Campbell 1996). At the same time, there is a debate on how to translate this concept to practical, measurable initiatives (Berke and Conroy 2000; Saha and Paterson 2008). This has resulted in a range of sustainability indicators, including comprehensive plans (Berke and Conroy 2000), local implementation of national-level sustainability initiatives (Chifos 2007), environmental programs (Lubell, Feiock, and Handy 2009), and a ‘sustainability index’ that provides a score for the number of individual policies a government has adopted related to each of the three components of sustainability (Conroy and Iqbal 2009; Jepson 2004; Portney and Berry 2010; Saha and Paterson 2008). While comprehensive plans are a meaningful product of planning processes that indicate the explicit sustainability goals of a community (Conroy and Berke 2004), as Saha and Paterson (2008) state, for sustainability to be advanced, local governments must transform those goals into specific actions. We follow those who examine an index of policies and programs that, taken together, contribute to sustainability.

Because we use policy and program adoption as a measure of the outcome of municipal planning processes, we draw on policy adoption theories to help us understand what factors lead to successful sustainability planning efforts. More specifically, we employ the political market theory of municipal policy making to explain why some communities plan for and adopt policies

that promote sustainability while others do not. The political market theory allows us to analyze sets of variables typically considered by planning scholars within a framework that considers the influence of interest group, public choice, and institutional factors. We briefly review these models, and expand on how they can be used to understand differential adoption of policies that advance sustainability.

Interest group model

Interest groups participate and compete with each other in planning processes, making demands on local officials to secure outcomes favorable to their goals. The policy that emerges is largely shaped by the interest group that is best able to overcome collective action problems to focus their efforts and to effectively deliver political resources to municipal officials (Lubell, Feiock, and de la Cruz 2009; Ramirez de la Cruz 2009). The interest group model is often applied in land-use regulation debates, where development interests are well-organized and have a disproportionate influence, and where public interest groups mobilize to push back against growth, with their success depending upon their relative strength (Ramirez de la Cruz 2009). If sustainability policies are seen to meet multiple goals, typically competing interest groups may support them; however, if individual policies are seen to favor one group over another, the interest group model suggests that whichever group can best organize and influence municipal officials and planning processes will shape policy outcomes (Lubell, Feiock, and Handy 2009).

Public choice model

The public choice model, similar to the public goods (Lubell, Feiock, and Handy 2009) and property rights (Ramirez de la Cruz 2009) theories, posits that municipalities compete with

each other to attract and keep businesses and tax payers in their communities by implementing policies that provide municipal goods and services at lower costs (Diaz and Green 2009).

Residents and businesses demand public goods and are prepared to move to a new location if a municipality does not meet their needs (Fischel 2004; Tiebout 1956). If a community experiences high growth and local services are undermined, residents may become concerned about, for example, increased traffic, increased pollution and reduced open space, and demand measures of growth control (Homsy and Warner 2014; Lewis 2002; Wassmer 2006). If the public choice model describes municipal policy making, we would expect that policies that encourage sustainable development to be adopted when population and development are increasing rapidly.

Political market model

The political market model suggests that both interest group and public choice theories partially explain municipal policy adoption, and builds on both theories by including institutional factors (Lubell, Feiock, and Ramirez 2005). Interest groups such as businesses and environmental advocates are still vying for influence, and are motivated by economic decline or a scarcity of environmental resources; however, their success depends upon the institutions in which government officials are operating (Feiock et al. 2014). Policy emerges from dynamic negotiations between policy suppliers (i.e., local officials) looking for their own gains and policy demanders (e.g., residents) pursuing their own interests (Lee 2010). The institutional structural setting in which municipal officials act influences their reaction to demands, such that different interests will have more or less sway in different governmental structures (Feiock, Tavares, and Lubell 2008; Krause 2011; Park, Park, and Lee 2012). Political market research reveals mixed

results on the relative influence of legislative and executive structures on policy outcomes (Krause, Feiock, and Hawkins 2016; Lee 2010; Lubell, Feiock, and de la Cruz 2009). Further, while executive and legislative branch characteristics are the most common institutional variables examined, others (e.g. departments) may also influence policy development (Feiock et al. 2014).

Municipal executive branch structure is quite variable, and includes mayor-councils, manager-councils, and hybrids of both systems (Frederickson and Johnson 2001). Because mayors rely on political support to be elected, they may be more responsive to development interests who provide financial backing during campaigns, and therefore may be less likely to support policies that place limits on development (Ramirez de la Cruz 2009). Managers may be considered professional experts and, being more isolated from community interests, may be driven primarily by professional ideals and career promotion and more apt to support sustainability efforts.

To date, political market theory has not fully incorporated some institutional characteristics into the analysis of how institutions mediate interest group demands that are relevant in smaller municipalities. First, examination of smaller communities provides the opportunity to explore the influence of institutional structures that build capacity (i.e., knowledge, leadership, resources). For example, while having professional planners on staff is a given for larger municipalities, the same is not true for smaller ones, despite the likelihood that planners can help guide community conversations around sustainability (Hanna 2005). Also, some smaller municipalities may engage specialized volunteer boards focused on issues related to sustainability, such as a conservation commission or a downtown revitalization board, supplementing municipal resources (Homsy and Warner 2014). Second, while fiscal capacity is

often included in analysis of municipal policy adoption, it has not been considered an aspect of institutional structure in political market theory. Municipalities with greater fiscal resources may be more proactive in planning (Kwon, Berry, and Feiock 2009; Lubell, Feiock, and Handy 2009). We suggest that fiscal and staff capacities are institutional characteristics which may be as likely to influence municipal officials' reactions to interest group demands as does executive branch structure.

Lastly, most studies do not recognize the town meeting structure (Frederickson and Johnson 2001; Lee 2010; Nelson and Svara 2011) despite its prevalence in small towns, especially in New England. For example, in Maine, USA, 53% of communities use a town meeting form of government and an additional 35% use a manager-town meeting form. Yet the influence of a town meeting structure on the likelihood that a municipality will adopt policies relevant to sustainability has gone largely unexamined. All adult residents can debate and vote at town meeting, and therefore, town meetings are theoretically representative of the intent of the community (Maine Municipal Association 2005; Meyer and Konisky 2007). We suggest that town meeting could be considered similar to a direct democracy system, in which policy choices likely reflect the median voter's preferences (Lubell, Feiock, and de la Cruz 2009).

Methodology

Study location

We used information from incorporated municipalities in Maine, USA. Municipalities range from 66,000 people in the largest city, Portland, to an island with a population of five. Saha and Paterson (2008) found that different initiatives are adopted in different regions of the United States. There is a dearth of knowledge about sustainability policies in New England

municipalities. In addition, we assert that Maine municipalities are representative of the smaller, more rural municipalities that are found throughout the northeast and midwestern United States. Maine, with its history of local control, is relevant to home rule states as diverse as North Dakota, Ohio and Connecticut. In home rule states, communities have control over many decisions within their jurisdictions (Kartez and Casto 2008; Nolon 2006), which may distinguish them from municipalities in other states. Finally, Maine municipalities differ along a range of biogeographical settings, socio-economic characteristics and institutional structures, providing the variation necessary for elucidating the factors that are associated with greater adoption of relevant policies. In particular, the population span of Maine municipalities allowed us to provide a nuanced understanding of the potential role of small communities, many of which are smaller than included in any of the national surveys of municipal sustainability (Feiock, Krause, and Hawkins 2014).

Municipal sustainability index

Although documented examples of municipal actions that purposively achieve economic, environmental, and social objectives under the rubric of ‘sustainability’ are rare (Berke and Conroy 2000; Jepson 2004), researchers often identify practices that promote sustainability even without it being the stated intent (Krueger and Agyeman, 2005). Following these studies, we addressed this challenge by creating a sustainability index from a set of eight policies and programs that directly promote environmental, economic or social well-being without compromising the other aspects (Table 1). We drew on similar sustainability indices reported in the literature, adapting them to the context of smaller municipalities (Conroy and Iqbal 2009; Jepson 2004; Portney and Berry 2010; Saha and Paterson 2008). There is no single set of policies

to include in an index, and prior examples include between 16 and 39 policies and programs with different degrees of overlap. Starting with a compiled list, we excluded policies relevant only for urban centers (e.g., public transportation, brownfield redevelopment, carpool lanes, heat island analysis). We also eliminated programs most likely created by community members rather than through municipal government action in the U.S. (e.g., eco-village, cooperative housing), or that are good planning practices rather than specifically related to sustainability planning (e.g., public involvement; dispute resolution).

Finally, each policy in our index addresses at least one other goal of sustainability in addition to the primary one in which it is categorized. For example, open space subdivisions provide conservation land as well as reduce infrastructure development costs, incentive zoning can attract development while providing for affordable housing, and infill ordinances can facilitate efficient development opportunities that reduce sprawl. Thus, while municipalities that promote policies in all three categories are most strongly promoting sustainability, those who have only one or two policies can be seen as making smaller contributions in a way that's relevant to their context. For example, housing may already be affordable in a rural community but maintaining a vibrant downtown is a bigger challenge. Following prior conventions, we summed the number of policies and programs adopted to determine each town's sustainability index score (Lubell, Feiock, and Handy 2009; Portney and Berry 2010).

Table 1 here

Data collection

We identified whether or not a municipality adopted the index policies based on most recent land-use, subdivision, and related stand-alone ordinances. Some ordinances could be found online and downloaded; for those not available via the internet, we called the municipal office to request a paper copy. We called each community a minimum of three times. Of 461 municipalities in the State, ten towns were not reachable and 68 responded that they had no ordinances. These 68 municipalities received an index score of zero. We reviewed all collected ordinances for the presence of index policies. We also collected a list of municipalities that had adopted pay-per-bag trash or single-stream curbside recycling programs as of 2010 from the Maine Department of Agriculture, Conservation, and Forestry, and a list of communities supporting farmer's markets as of 2012 from the Maine Organic Farmers and Gardeners Association.

Independent variables

Interest group theory variables

To represent development interests, we used the percent of residents that were in the construction and development industry (Krause 2011) as per the 2010 Census. We also identified the municipalities in which a local chamber of commerce was active as of 2012 as reported by the Maine Chamber of Commerce. To represent the presence of environmental interests, we determined the number of environmental license plate purchases (lobster, agriculture, and conservation) per capita in 2012 (Lubell, Feiock, and de la Cruz 2009) as recorded by Maine Department of Motor vehicles. We employ these purchases as a proxy for environmental interests because they cost an additional \$20 and are marketed as supporting natural resources conservation. In addition, we identified communities served by a local land trust in 2012 as

provided by the Maine Land Trust Network. We also collected three demographic variables from 2012 reported to be associated with citizens who promote sustainability efforts in other locations: percent Democratic voters, mean household income, and percent of the population age 25 and over with a college degree (Krause 2011; Lee 2010; Lubell, Feiock, and Handy 2009).

Public choice theory variables

We employed variables indicating increased growth and diminishing open space: percent change in housing units and percent change in population (Feiock, Tavares, and Lubell 2008; Lubell, Feiock, and Handy 2009; Ramirez de la Cruz 2009), which we obtained from the 2010 US Census. We also calculated the percentage of land area in each municipality covered by impervious surface in 2004 using data downloaded from the Maine Office of GIS (MEGIS). Finally, we included population size in 2010 and land area in acres as indicators of the scale and need of public service provision.

Political market theory variables

We obtained a categorization of each municipality's executive branch structure from the Maine Municipal Association (MMA). MMA uses 12 types of government form, from which we created four general categories: mayor-council, manager-council, manager-council-town meeting, and council-town meeting (Feiock, Tavares, and Lubell 2008; Jacobs et al. 2010; Krause 2011). Town meeting structure is the omitted category in our regression analysis, and therefore is the category to which other structures are compared.

We used two metrics of administrative capacity from 2012: municipalities that have a planner on staff as provided by the Maine Association of Planners, and that have a volunteer-

staffed conservation commission, as determined from the Maine Association of Conservation Commissions and municipal websites (Homsy and Warner 2014; Krause 2011; Ramirez de la Cruz 2009). Our measure of fiscal capacity is per capita revenue in 2011 (Homsy and Warner 2014; Lubell, Feiock, and Handy 2009; Press 1998) as provided by the Maine Revenue Service.

Data analysis

Prior to model estimation, we generated descriptive statistics (Table 2) and tested for multicollinearity. Because of the discrete, non-negative integer nature of our dependent variable (sustainability index), we employed count regression models (Cameron and Trivedi 2013). The count models provide an estimate of the influence of each independent variable on the number of index policies adopted by a municipality. We estimated Poisson regression models and then conducted statistical tests of overdispersion to ascertain the appropriateness of the models (Cameron and Trivedi 1990).

We estimated four separate Poisson regression models to test the influence of variables from each municipal policy adoption theory, and compared results across these models. Models one and two test the effects of the interest group theory variables and public choice theory variables on index adoption rates, respectively. Model three tests the influence of institutional variables in isolation. In model four, we test a complete political market set of variables. We assessed the strength of individual models using AIC and log-likelihood. We used R software to conduct all of our statistical analyses (R Core Team 2014).

Table 2 here

Results

Smaller municipalities do plan for and adopt policies that contribute to sustainability efforts. Of 451 communities for which we had data, 68% adopted one or more policies that promote sustainability, of which 23% have an index score of 3 or greater (Fig. 1), and 14% adopted at least one policy from each of the three categories. The two most common policies for municipalities to adopt are incentive zoning and a trash reduction program (adopted by 40.4% and 45.0% of municipalities, respectively), while the least common are infill ordinances and transfer of development rights (Table 1). The towns with the highest index are located in southern and coastal areas, but municipalities with scores of three and four are distributed across the State.

Policy adoption models

Our models presented no major problems with multicollinearity based on correlation matrices and variance inflation factors (VIF); no VIF scores exceeded 10 (Nelson and Svara 2011). Poisson models were appropriate to use for models 1, 3, and 4; we reject the equidispersion assumption for Model 2 (public choice) based on the Cameron and Trivedi (1990) equidispersion test (Models 1 through 4, respectively: 0.63 (p=0.26), 2.99 (p<0.01), 0.90 (p=0.18), and -1.52 (p=0.94)). Similarly, Models 1, 3, and 4 pass a Pearson chi-square test, while Model 2 did not (448.89 (p=0.23), 503.05 (p=0.01), 470.64 (p=0.17); 386.57 (p=0.85)). To adjust for the overdispersion in Model 2, we calculated corrected standard errors for coefficient estimates using the Pearson chi-square test result.

For each independent variable, we provide the coefficient estimate as well as the incidence rate ratio (IRR), which provides the multiplicative effect of a one unit increase of the predictor on the mean of the sustainability index (Table 3). For example, the Chamber of Commerce variable in the interest group model has an IRR of 1.32, suggesting that the

sustainability index is 1.32 times (or 32%) higher in municipalities with a local Chamber office, *ceteris paribus*. Likelihood-ratio tests reveal Model 4, which represents the political market theory of policy adoption, is the preferred specification for this study.

Table 3 here

Interest group model results

One of our development interest variables in Model 1, the percent of the residents employed in the development and construction industries, had a significant and negative influence on index scores as expected, but the other variable, being within a Chamber of Commerce service area, had a significant but positive association with policy adoption rates. All the variables associated with the presence of environmental interests except environmental license plate purchases had a significant and positive effect on the probability of a community adopting policies promoting sustainability. For example, the presence of a land trust in a community was associated with a 31% increase in the sustainability index score.

Public choice model results

Two measures of increasing growth used in Model 2, percent increase in housing units and percent impervious surface, were significant and positively associated with higher index scores as expected. A greater land area also had a small but significantly positive effect on index scores. The percent impervious surface had the strongest marginal effect in our model, increasing the index by a factor of 1.06.

Political market model results

We ran two models related to the political market model. In Model 3, we explored the influence of institutional variables only. We found that, relative to a town meeting structure, mayor-council, manager-council, and manager-council-town meeting structures are all more likely to adopt sustainability index policies. The presence of town-meetings decreases policy adoption rates. Our three measures of institutional capacity were also significant; greater fiscal resources, a planner on staff, and a citizen-based conservation commission all increase the likelihood of a larger sustainability index.

Model 4 is a full political market model that combines institutional variables with interest group and public choice indicators. With municipal institutional structure included, development interests no longer exert influence over policy adoption, but environmental interests, as measured by land trusts and by more wealthy residents, do increase adoption rates. One public choice model indicator of increasing growth, increase in housing units, is also significantly associated with a larger sustainability index. Executive structure institutional variables are the most powerful in explaining adoption of policies. Again, we find that the presence of a town meeting significantly decreases policy adoption rates. Likelihood ratio tests show that the full political market model 4 is superior to the interest group model 1 ($X^2=81.98$, $df=11$, $p<0.00001$), to the public choice model 2 ($X^2=155.28$, $df=13$, $p<0.00001$), and to the institutional variables model 3 ($X^2=112.18$, $df=12$, $p<0.00001$).

Discussion

Researchers of municipal planning have suggested that smaller municipalities make little contribution towards sustainability efforts in comparison to larger cities (Conroy and Iqbal 2009;

Homsy and Warner 2014; Lubell, Feiock, and Handy 2009). In this study, we delved more deeply into sustainability planning in small municipalities and examined what enables them to do so. We created an index of eight policies and programs that matches the context of the issues and scale of small communities and allows us to distinguish smaller municipalities based on the extent to which they promote sustainability through planning.

We found that municipalities differ in the number of adopted policies that promote sustainability. Building on studies that found population size is one of the most important factors determining how many sustainability index policies are adopted (Conroy and Iqbal 2009; Lubell, Feiock, and Handy 2009), we found that while the largest municipalities in Maine were likely to have larger index scores, of the 22 communities with the highest index scores in our sample, over half had populations less than 10,000, and 10% had populations less than 2,500. We do not argue that population size is unimportant, but, rather, that a more nuanced, alternative specification might allow for a differentiation between the effects of other parameters across communities of different population size.

In further exploring policy adoption, we followed the direction of scholars interested in how political institutions mediate and shape other forces that were traditionally theorized to influence municipal planning and policy adoption forums (Feiock, Tavares, and Lubell 2008; Lubell, Feiock, and Ramirez 2005). Our results confirm that, in isolation, the variables representing key aspects of both interest group theory and public choice theory are successful in explaining the variation between policy adoption rates; municipalities with strong environmental interests and higher growth were more likely to create and adopt sustainability policies (Lubell, Feiock, and Ramirez 2005). However, our political market model 4 was better at explaining variation in policy adoption rates, suggesting that institutional structure plays a very important

role in policy adoption (Ramirez de la Cruz 2009). In other words, the governmental structure, local interest groups and growth pressures of a municipality jointly determine the likelihood that sustainability planning efforts will result in policy adoption. This suggests that more simplistic theories of policy adoption can be strengthened by accounting for institutional factors, even in smaller municipalities.

Our results also suggest that there may be institutional characteristics that are relevant to planning actions in a smaller community that were not previously incorporated into the political market model of policy adoption. First, institutional structures that build capacity (i.e., knowledge, leadership, resources) are strongly associated with planning and policy adoption in these communities (Evans et al. 2005; Krause 2011). For example, citizen boards or committees (i.e., conservation commissions) may supplement limited staff, frame policies for public consumption and help build public support (Homsy and Warner 2014). Various municipal institutional structures may result in different institutional capacities, which, in turn, affect how well a municipality can respond to demands for sustainability policy (Evans et al. 2006). While small municipalities may generally be associated with having less capacity, this is not true across the board and it may be more useful to distinguish municipalities based on institutional structures that build capacity rather than on size alone when assessing likelihood to promote sustainability.

Second, communities that only use town meetings as decision making forums are associated with lower sustainability index scores; those that have an administrator and council along with a town meeting are likely to have slightly increased policy adoption rates; and municipalities without town meetings (and with either managers or mayors) are associated with the highest sustainability index adoption rates. This suggests the need for future study of the institutional dynamics differentiating municipalities with and without town meetings. While

Maine municipalities that use town meetings tend to be smaller, once we control for institutional structure, per capita revenue becomes insignificant, suggesting that the town meeting structure of government is important and is not simply a proxy for less fiscal capacity. It may be that the town meeting form of government is less likely to generate innovative policy solutions; without facilitation of a more deliberative process that accounts for power issues, political context, the role of science and the composition of participants, this direct democracy structure is more likely to maintain the status quo (Chifos 2007; Hamlin, Gurrin, and Emlinger 2014; Layzer 2002; Stringer et al. 2006; Turnpenny, Lorenzoni, and Jones 2009). This result indicates that planners working in municipalities governed by town meeting may face more obstacles, but may increase their chances of success by engaging local boards and other respected knowledge sources to explain and promote sustainability policies before and at town meetings.

There are several practical implications of our research for planners striving to promote sustainability in smaller municipalities. First, there may be methods for increasing the institutional capacity in municipalities that struggle to plan for sustainability. For example, state governments can facilitate the hiring of professional planners shared by more than one municipality who can support important institutional structures such as conservation commissions and who can interact with engaged interest groups such as land trusts. Similarly, regional planning commissions could conduct training about sustainability policies and programs aimed at citizens, who, in areas like New England, serve on local councils, committees, and land trusts, and who attend and vote at town meetings. These recommendations echo similar suggestions by others to rely on collaborations, networks and volunteers to fill gaps in capacity within small municipal governments (Hoppe and Coenen 2011; Knox and Mayer 2012).

A second implication of our research is the need to consider how interest groups, growth patterns and local politics influence planning efforts to promote sustainability. For example, planners can target sustainability outreach efforts to connect with local environmental interests and highlight growth patterns, and simultaneously interact with top municipal administrators and elected officials who will be responding to these exogenous factors. By recognizing that policy adoption results from the joint influence of town leaders, citizen groups and increased growth, planners can spend their limited resources on engaging with these key components of the process. In doing so, planners can support the development of a strong local government and an informed citizenry, both of which are key factors in enabling a community to embrace sustainability policies (Evans et al. 2005, 2006; Khakee 2010).

In drawing these conclusions, we recognize several limitations of our study. First, this study comprehensively examined one state; how our results apply to municipalities in other states, especially in different regions, remains to be tested. The policies we included in our sustainability index, for example, may not be appropriate for other areas in the U.S., and future research could more thoroughly examine the range of policies that promote sustainability in large and small municipalities. Second, we assume that adoption of any of the policies in our index is a move toward sustainability, and that different sized municipalities pursue sustainability in different ways; these assumptions warrants further investigation. In particular, sustainability indices that do not require municipalities to adopt policies from all three sustainability goals (environmental, economic, social) may be limited in the conclusions that can be made about the extent to which municipalities promote sustainability. Furthermore, any regression analysis must use variables that are proxies for underlying dynamics; if our variables do not accurately represent the relevant interest groups, measures of development, and institutional structures, our

ability to comment on factors influencing policy adoption is limited. Likewise, we were not able to incorporate time variables; we cannot claim that the measured characteristics of each municipality pre-dated the adoption of policies. Finally, a municipality's adoption of a policy does not necessarily mean that the policy is enforced or that it has resulted in measurable outcomes. Thus, policy adoption is simply one step in promoting sustainability.

We found that smaller municipalities do adopt policies that contribute to broader sustainability goals. To ignore these efforts is not only to overlook and hence misunderstand the complete picture, but also to miss opportunities to celebrate and promote the initiatives that small communities make. Our work suggests interesting implications about planning actions in different sized communities. We recommend that future researchers give greater emphasis to the range of contributions by different actors to policy initiatives, including how smaller and larger municipalities may partner to address context-specific sustainability challenges in particular regions (Knox and Mayer 2012; Lubell, Feiock, and Handy 2009; Ostrom 1999). Consideration of context and capacity in discussions of planning for sustainability will help planners, key agents of change in discussions of sustainability, better identify, design, and benefit from collaboration, training, and community outreach opportunities.

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Table 1. Policies and programs comprising the sustainability index used to measure and compare municipalities’ contributions to sustainability.

Policy or Program	Description	% Municipalities adopting policy
<i>Environmental well-being</i>		
Pay-per-bag trash or single-stream recycling	Residents pay for trash bags; No sorting required for curb-side recycling pick-up.	40.4
Open space subdivision	New subdivisions that must set aside at least 25% of parcel as permanently conserved land.	13.1
Transfer of development rights	Developers in growth areas purchase development rights from rural area.	1.1
<i>Economic well-being</i>		
Incentive zoning	Reward (e.g. density) given for meeting desired condition (e.g. affordable housing).	45.0
Mixed-use zoning	Allows residential and commercial/office uses to co-locate in an area.	29.0
Infill development ordinance	Allows development in underutilized land within built up areas.	1.6
<i>Social well-being</i>		
Farmer’s market	Allows use of indoor or outdoor spaces for sale of local farm products.	22.0
Affordable housing requirement/impact fee	Developer must provide affordable housing or pay fee to do so.	3.8

Table 2. Descriptive statistics of independent variables used to test policy adoption theories.

	Mean	Std. dev.	Min	Max
Interest group				
Chamber of Commerce service area (-)*	0.67	0.47	0	1
% residents working in construction & development (-)	14.30	8.75	0	57.70
Per capita environmental license plate purchases (+)	0.07	0.06	0	1
Land trust active in the community (+)	0.58	0.49	0	1
% Democratic voters in 2008 (+)	50.88	12.38	0	84.31
% college degree (+)	14.86	6.84	0	45.83
Mean household income (\$) (+)	46,452	12,027	11,667	92,262
Public choice				
% change in population 2000-10 (+)	24.93	201	-99.8	310
% change in housing units 2000-10 (+)	11.63	9.43	-17.1	50.4
% impervious cover (+)	3.70	3.83	0	36.37
Population 2010 (+)	2920	5164	5	66194
Land area (acres) (-)	21,899	9,439	853	82,226
Political market- executive branch form				
Mayor-council (-)	0.05	0.21	0	1
Manager-council (+)	0.05	0.22	0	1
Manager-town meeting (+)	0.35	0.48	0	1
Town meeting	0.54	0.49	0	1
Political market- capacity				
Conservation Commission (+)	0.17	0.37	0	1
Planning staff (+)	0.11	0.32	0	1
Per capita revenue (\$) (+)	1,614	1,226	0	10,913

*Sign of hypothesized influence on policy adoption rates in parentheses.

Table 3. Poisson regression models of municipal policy adoption.

	Model 1: Interest groups		Model 2: Public choice		Model 3: Institutions		Model 4: Political market (PM)	
	Coeff. (S.E.)	IRR	Coeff. (S.E.)	IRR	Coeff. (S.E.)	IRR	Coeff. (S.E.)	IRR
Intercept	-1.31 (.29)***		-0.21 (.15)		-0.12 (.008)		-1.40 (.38)***	
Interest group indicators								
Chamber of commerce	0.27 (.10)**	1.32					0.09 (.11)	1.10
% development industry	-0.02 (.01)***	0.98					-.01 (.01)	0.99
Environment license plates (per capita)	-0.32 (.74)	0.73					1.95 (1.45)	6.99
Land Trust	0.27 (.10)**	1.31					0.27 (.10)**	1.31
% Democratic	0.01 (.005)*	1.01					0.005 (.005)	1.01
% BA degree	0.02 (.01)**	1.02					0.01 (.01)	1.01
Mean household income (\$1,000)	0.01 (.003)***	1.01					0.01 (.004)*	1.01
Public choice indicators								
% population growth			-0.001 (.001)	1.00			-0.001 (.001)	1.00
% housing growth			0.01 (.004)**	1.01			0.009 (.005)*	1.01
% impervious surface			0.06 (.01)***	1.06			0.02 (.02)	1.02
Land area (1,000 acres)			0.01 (0.005)*	1.01			0.01 (.01)^	1.01
Population (1,000 people)			0.01 (.008)	1.01			0.01 (.01)	1.01
Political market indicators								
Mayor-council					0.62 (.16)***	1.86	0.53 (.20)**	1.71
Manager-council					0.64 (.15)***	1.89	0.57 (.17)***	1.76
Manager-council- mtg					0.38 (.09)***	1.47	0.35 (.10)***	1.41
Conservation Commission					0.48 (.09)***	1.61	0.19 (.11)^	1.21
Planner on staff					0.52 (.12)***	1.69	0.07 (.14)	1.07
Per capita tax revenue (\$1,000)					0.06 (.03)*	1.06	-.05 (.05)	0.95
AIC:	1321		1390		1349		1261	
Log-Likelihood:	-652.51		-689.16		-667.61		-611.52	
Residual deviance (df):	520.10 (428)		593.40 (430)		533.05 (442)		440.74 (416)	
Null deviance (df):	720.42 (435)		720.42 (435)		744.87 (448)		720.32 (434)	

Note: The standard errors for Model 2 have been corrected for overdispersion; IRR = Incidence Rate Ratio; ^p <.10, *p<.05, **p<.01, ***p<.001

Figure 1. Sustainability index scores adopted by percentage of municipalities

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